https://www.youtube.com/watch?v=-2ngmVwXteE

The existence of antimatter | Lee Smolin, Sabine Hossenfelder and Tara Shears

Existence antihmoty | Lee Smolin, Sabine Hossenfelder a Tara Shears

24 893 zhlédnutí
•8. 5. 2021
+ my opinion in red ((I believe that imperfect translation will be overcome by good thinking and imagination)) ((I don't speak English, I do everything with google-translator.))
00:00
[Music]
00:07
[Music] you can't solve the problem you will always need to put in some initial condition and then you can ask well why this initial condition [Music] [Applause] why are we here i happen to let us be left over at our amount of matter and that's what we really don't understand how would we make a theory of the initial condition a theory of all the parameters in the standard model *The parameters you are talking about are the "imprints" of geometric-topological states of the shapes of elementary particles, which formed after the Bang in the "boiling foam of dimensions" of space-time two quantities. These are elementary particles made of the space-time dimensions after the Bang in that plasma. These objects: wrapped balls have remained a "clone" (indivisible) for ages (quarks, leptons, bosons)… therefore their shape "shows" papameters that come in two phenomenon like the asymmetry between matter and antimatter welcome to uh the anti-universe from star trek to dan brown novels doctor who to marvel comics antimatter is fascinated since it was proposed by dirac in the 1920s and confirmed with the discovery of the positron just a few dear years later heisenberg the father of uh modern physics referred to its discovery as quote the biggest jumps of all the big jumps in physics but there's a fundamental problem the theory predicts the disappearance of the universe within moments of its inception as mata and antimatter destroy each other in a huge * You say and believe, according to the "findings" of physicists, that after the big-bang, almost the same amount (pieces) of particles and anti-particles were formed, ie 1,000,000,000 - 999,999,999 = 1, which annihilated a… and the "one", what remains then presents all the matter of this universe (anti-matter remained none). Etc., etc. The world of matter then evolved through genetic changes, fusions, and other evolutionary transformations as we already know… in this world, not in the anti-world. cataclysm yet here we are 14 billion years later and we seem to have good evidence our universe exists and yet scientists still uphold the antimatter theory is it time to give up the idea that for every particle as an anti-particle or would this be a threat to particle physics itself is it right to overlook fundamental flaws in a theory in favor of neatness and simplicity and buzzwords or nearly a century on from its inception should we stand by the theory confident that a solution will be found well with me to uh discuss this uh fascinating topic we have a remarkable panel to tackle this deep puzzle

Sabina Hossenfelder is an author and physicist who researches the foundation of physics sabine is not afraid to be controversial (she couldn't afford it in the Czech Republic) her books include lost in math how beauty leads physics astray and talks such as what's wrong with physics Tara Shears is a particle physicist and one of the leading british scientists at CERN Tara's also collaborated with artists and novelists to explore concepts involved including an exhibition at the royal society titled antimatter matters no doubt we'll be hearing from her why she thinks so today and Lee Smolin is one of the world's leading theoretical physicists he's been a critic of string theory notably in his book the trouble with physics and has instead devised his own means of unifying quantum mechanics and relativity loop quantum gravity along with others Lee is also a professor of philosophy and has written a number of books in this field arguing there's only one universe and that time is real so i'm going to give each of our speakers just three minutes to set out their initial response to the question is it time to give up on our theory of antimatter …

* As the fourth speaker, I would change this scenario: Before the big-bang, there was only a state of space-time without matter, ie space-time 3 + 3D dimensional absolutely Euclidean flat, infinite "inertial", no passage of time, no expansion, no matter. Big-bang occurred as a "leap change of state", ie from a totally flat infinite space-time to a totally curved finite-space-time = singular. Both extremes, both regional possibilities, alternated. After the big bang, there is a singularity (locality) of "foamy space-time" on the stage, a locality of "boiling" dimensions of space-time. It is a state of chaotic "twisted, twisted" dimensions of 3 + 3 space-time (Why I state that time also has three dimensions, I discuss this elsewhere, in a different interpretation. Explanation later.). That is, this locality = singularity is a state only and only a dimension of 3 + 3 spatiotemporal in which there is no matter in the first moment of existence. That mass !! in this "foam" of n + n dimensions, extremely densely curved dimensions, they will be "born" - realized. In the chaotic "boiling foam" of dimensions, jump changes occur again, ie mini-local stop-states of frozen solidified dimensions = packages, balls, geons, which will no longer "boil" themselves, but will be a "frozen" state of some topology, some geometric shape (Similar to the stringers, they describe "quantum loops from strings." Here they are "topological loops from the dimensions of" Time "and" Length "). For string theorists, the strings are "out of nowhere" twisted into loops, for me in HDV there are "loops = packs, geons, balls", not "out of nowhere" "floating" in the opening chaotic foam of dimensions, they are constructed = made directly from dimensions of space-time itself, not of demonic strings created by God. (*). And these balls, frozen "stop states", in a simple topological design, are already the material elements (quarks, gluons, leptons, bosons, etc.). These "clones" forever do not change the shape or number of dimensions from which they were modeled into the topological formation… , thus remaining unchanged their characteristics = properties such as mass, spin, charge, and quantum numbers. The elements are still "floating" (nested) in the initial "foam" = plasma. The foam of chaotic dimensions is mathematically linear. The foam begins to expand. In fact, it is not "Ghutovsky, Hubbleovsky" that is expanding in inflation, but it is beginning to expand. (!) http://www.hypothesis-of-universe.com/docs/c/c_223.jpg . From the beginning, after the Big Bang, the universe has not expanded in inflation, but is expanding. Spacetime expands at each point in that spacetime, not just "from a single point-singularity." Not. Even today, it expands space-time from every point of the vacuum, on the Planck scales, as follows http://www.hypothesis-of-universe.com/docs/c/c_223.jpg and this then creates that structure of a homogeneous universe, as well as the structure of a relict visual " ripple-stratification '. So the universe not only expands into global expansions but also collapses "simultaneously" into mass-complex structures - after the Big Bang when the basic particles merge into atoms, etc. Even today, perhaps a new matter, at least the unknown, may be born in a vacuum on Planck scales. unexplored dark energy. Even from Třesk, space expands at a "different pace"

and time at a different "pace". Why not ? The time before the big bang did not run. c = 1 (c^3 = c^3). After the big bang, time "starts", it begins to flow, precisely because there is an asymmetric unpacking of foam dimensions, spatial dimensions and temporal dimensions. v < c (v_1. v_2. $v_3 < c^3$) (In the plasma = in the chaotically boiling state of 3 + 3 dimensions of space-time, the flow of time, the passage of time is "omnidirectional", so there is no arrow of time, and therefore there is no "anti-world separated by a wall from the world". This soon changes as the 3 + 3 dimensional foam begins to unfold. Beyond matter in the world (not in the anti-world), time expands "in one forward arrow." (In the opposite world, vice versa.) Inside the geon = package = cube = in the material element, time is "wrapped" not only "forward" but also "backward", ie inside time flows into a tiny interval "backward" and thus "" freezes "", in topological curvature, forever. The balls are constructed from the time dimension in both directions. Then in "the surrounding space-time (v_1. v_2. $v_3 < c^3$)." In the world, time has an arrow in one direction, and in the anti-world, the arrow of time flows in the opposite direction. That doesn't mean that after the big bang, the universe soon split into two universes, no !! The world and the antiworld are separated by an "imaginary wall" then, and that wall is still there in every age of the universe, in every time We still have the anti-world around us - in it time runs in the opposite direction and there are antiparticles placed in it, which sometimes "jump" from the anti-world into the world and for a short time, with a short lifespan. We have a vacuum around us, in which the "wall - gate" is striking on the Planck scales and there live particles and antiparticles, which jump from one quadrant to another and vice versa back. (also virtual pairs of particles). In the global universe 13.8 billion years after Bang, space-time is so unfolded that we encounter only one arrow of time, "our arrow to the future." The foam of vacuum is still between us throughout the existence of the universe, it is symmetrical, so quantum mechanics is symmetrical. Gravity is nonlinear, it is the "parabolic curvature" that results from unpacking that "foam". It is not necessary to connect QM with OTR by mathematical force, they can live side by side, without merging into a "unified" theory….) unfolded nonlinear states - gravity, b) in linear nuclear interactions of wave packages which are not "linear" themselves až, until it also unfolds into a big-flat crash. (see R. Penrose - multiverse) Repetition: In the foam of the boiling state of dimensions (plasma), "balls", "wave packages", geons will appear, which in the subsequent reality will be matter, material elements, particles and anti-particles. After the Big Bang, the "three-quantity" universe will emerge from the original two-quantity universe if we assign matter to physical quantities. The other foam remains a "boiling environment" of dimensions, in which these frozen clones-packets-balls "float" which will present themselves as elementary particles in the subsequent development. http://www.hypothesis-of-universe.com/docs/c/c_387.jpg ; http://www.hypothesis-of-universe.com/docs/c/c_388.gif (abstract images of some wave packages: http://www.hypothesis-of-universe.com/docs/c/c_025.jpg ; you the basic elements certainly have much simpler geometric shapes of balls) "Surrounding" foam begins to expand. Not clones-packages. The geometry of the package-clone dimensions is unchangeable, forever, unless it is "broken" into jets or other shards by collisions in accelerators. (conglomerates of elements such as atoms, molecules, which of course can be split into simpler fragments, can be collided, even chemically) And these packages made of the dimensions of two super-basic quantities (3 + 3D) will be presented as elementary particles and anti-particles. But be careful !!! After the big bang, the world (ie space-time) begins to evolve in two directions in terms of the flow of time, the passage of time, the pace of time, and the direction of time. In the World, time flows in one direction (it expands "from the foam" in one direction) and in the anit-world, time will unfold, flow, in the opposite direction. Thus: The initial foam of 3 + 3 dimensions of space-time is "divided" into two sectors, into two quadrants = a) world and b) anti-world, where in the world time will have a time arrow "in one direction" (we call it the future) and in anti-world "in the opposite direction". It is

similar in those packages = balls of matter and anti-matter. In the elementary particle "wraps" time = time dimension "right"…, and in the antiparticle "wraps" time = time dimension "left" They are symmetrical in spin rotation. And another refinement of the interpretation: From the very beginning, the Universe has existed in two quadrants (quadrant of the world and quadrant of the anti-world), which are separated by a "gate-wall" that is not "smooth". It is an interface-area, an interface where the two quadrants "intersect" into each other. We can also talk about the fact that these two worlds, these two quadrants are "mirror" symmetrical (perhaps not 100%?)… Mainly in terms of the flow of time symmetrical. And here it occurs (during interactions) that the "ball of anti-particle" jumps "from its quadrant" to "our" quadrant, and vice versa. Therefore, it seems to us physicists that after the creation of the universe, an asymmetry of matter and antimatter arose. Both species live "in their quadrants. In our quadrant, time unfolds "right", in the anti-world, time unfolds in the opposite way, to the left. Even this phenomenon is identical with the production of elementary particles and antiparticles. In the package-particle the dimension of time is curved, tangled "clockwise" and in the antiparticle the time dimension is tangled in the opposite direction, ie "counterclockwise". Now I will further develop this reasoning-divorce: The anti-world is-exists all around us, the anti-world is best shown on the Planck scales, even in a vacuum…, all around us people there is a "boiling vacuum" which means not in a temperature-boiling, but the space-time 3 + 3 dimensional "foams" just as it did after big-bang. In a foaming vacuum (foaming space-time dimension), pairs of particles and antiparticles are formed because they "jump" from their quadrants to the neighboring quadrant and annihilate there. The vacuum that "boils" actually represents that "dark energy". Yes, that is the explanation of that energy: everything that "curves" in the universe is in the form of matter (or antimatter). The curvature of dimensions is a mass-forming phenomenon, the curvature of dimensions is a form of the genesis of matter. Matter is not born "from Nothing", but is born by the curvature of space-time dimensions into "balls-geons". (in the ball there is also a time dimension "tangled", curled, once to the left, with anti-right) (and they then merge into atoms, molecules, compounds, etc. that is another story - chemistry and biology). The essence of matter + anti-matter (is the curvature of dimensions).

…and then we'll proceed to the debate so Sabina well so to answer the question is the time to give up on our theory of anti-matter i think the answer is no and to explain why let me pick up something that you said in the introduction that um the current theory predicts that our universe should have disappeared within the blink of an eye or something like this that's just not correct the theory does not predict that and to see why um i have to briefly explain how all our current theories work in the foundations of physics um you have you have something that's called the initial condition * One of the initial conditions should be one of the first laws of "this" Universe. After the Bang, not all laws were written somewhere on "God's paper" as we knew them today, but also laws gradually "formed-originated-realized" as the positions of elements changed according to the "principle of rotation": atoms were formed (strong interaction and gradually another 3), molecules, compounds and laws of chemistry and laws of biology. All this arose (laws and interactions and increasingly complex matter in parallel) that's a summary of all the information about the system that you're trying to describe so in in this case it would be all the particles in the universe and the universe itself and then we have something that's called an evolution equation which acts on that initial state and tells you what happens at all other moments . Evolution (not only physical) not only according to the Principle of alternating asymmetries with symmetries (PSSaAs)

…in time and the theories that we currently use they all work the same way so you need this initial condition to make any prediction with a theory but the theory cannot itself predict the initial condition and uh when we say that the universe should have been you know self-destroyed within a blink of an eye what this means is that we have made an assumption about

a particular initial condition in that case it's that there are exactly equal amounts of matter and anti-matter * By the time the Universe was created, the Rule of Alternating Symmetry with Asymmetry was in force! ! ! because the Bang itself became according to this rule, ie before the Symmetry Bang = 3 + 3D flat infinite Euclidean space-time and after the Bang the change of state to an extremely crooked foamy state of the dimensions "x" and "t", which immediately expands (see Ghut's inflation) to global-state and at the same time the state "x" and "t" at the level of the microworld "collapses" into those mass elementary particles and conglomerates into more complex structures such as atoms, molecules, compounds…; in this state of the "world" after the Bang, two quadrants immediately arise, ie the "world" and the "antiworld" (in each of them with the opposite flow-time arrow !!!!). In the anti-world, particles are "wrapped in the" opposite direction "than in the" world ", time is built into them with opposite spin directions. and those should have destroyed * Right annihilation means the "summation" of two opposing curvatures of the dimensions of time - it resets = the dimension straightens (this is also a consequence of the Rule of Alternation of Symmetry with Asymmetry). But this is not about real anillation-destruction, but about the separation of the world and the anti-world, where there are opposite curvatures of the time dimension. Antiparticles can "extend at the gate of two quadrants" into adjacent quadrants, but only for a small bit of the flow of time but it's very easy to solve the problem by just choosing ?? an initial condition that agrees * The universe chooses itself. ! People must know his choice, not choose the condition themselves with what we observe presently and that's actually what people also do when they work with these theories um so the actual problem comes down to saying there are certain types of initial conditions which we do not like and i don't think that this is a serious problem thank you sabino uh tara so i'm i'm going to come at this from an experimentalist point of view and and to me to answer this question it's first of all necessary to separate out what we mean by a theory of anti-matter and just what that's going to describe before we can justifiably say whether it's time to throw it away or not and i'm very much with sabine on this one so to me i would say the theory of antimatter the working theory of antimatter that we use is the one that's embedded in our theory of particle physics antimatter particles (living in the opposite arrow of time, in the second quadrant) enter our quadrant Universe = world + antiworld only for a very short time (for our forward time) this um the standard model and i say that simply because it's made some predictions the existence of antimatter which have then been proven by experiments so we have a cross-check so i am coming at this at a slightly different um point different angle of view so that's that's what i would take is our theory of antimatter i mean there are other theories out there but they do not yet have experimental verification so we don't really know if they're right or not so i'm going to stick with the standard model and we'll come back to that later in the debate as to whether that's a good idea or not um so that that's the theory of anti-matter is it is it time to throw it away well no absolutely not because to be honest we haven't finished doing it yet it's not complete um sabine made reference to the initial conditions at the start of the universe so i'd phrase this as an assumption that the big bang we assumed they were equal apar equal parts of matter and anti-matter in the universe we assume this it's fair to say it's a um i i'd phrase it as it's an argument phrased on conservation laws and symmetry * O.K., but symmetry itself does not yet explain why matter is "stable-stable" and antimatter only "prevails" for a short time. Before Třesk there is asymmetry, ie solo state, and after Třesk, symmetry, ie two quadrants - matter and antimatter, when the state immediately shifts to positions that only the state of the Universe develops "here", etc. but it is an assumption it's worth remembering that but it's the working assumption that we use we know that at that very early time in the universe when it was made of particles and their antimatter versions these particles and anti-particles did meet and annihilate in the sense of the description that you gave but on that very small scale we know after these annihilations more matter and antimatter was produced but we know this

process didn't carry on for very long and less than a second after the big bang something had happened to tip the balance in favor of matter * No coincidence, it was not a coincidence, but according to the law-rules on alternating symmetries with asymmetries, the Universe was divided into two quadrants with opposite arrows of time, ie "opposite" twists of dimensions (time) in the way we see it in the universe today when anti-matter is very rare * in our quadrant it has become rare (it lives here only for a very small interval with our arrow) This is a rare matter in the antiworld - the neighboring quadrant of the Universe. and why that happened the exact mechanism that governed why that happened the explanation that's we don't and that's what i think is necessary for us to conquer or with HDV in our theory of antimatter before we can make any decisions about what we do with it so there's a long long way to go um for me i'd argue that we don't have a theory that we know that really fully explains everything yet and we need it before we can give it up thank you tara and lee i'd like to go a little bit further and contemplate what a theory that explains the amount of matter versus antimatter * HDV already describes this that we see in the initial conditions because where we're in as Sabina emphasized a situation where our theory is incomplete in that knowing the laws of motion is only part of the physics and the other part that you need to explain why our universe is the way it * my vision is 40 years old and 20 years old hanging on the internet… but no one reads it… is is as Sabine said the initial conditions so how would we make a theory of the initial condition and related to that how would we make a theory of all the parameters * There is no need to invent a theory for the parameters, it is necessary to trace the states of curved configurations of dimensions, because they determine the parameters and they are "properties", parameters are "properties" of specific states of "frozen curvatures" of elements "in boiling vacuum" after Bang in the standard model that come in to phenomenon like the asymmetry between matter and anti-matter I described it in HDV, http://www.hypothesis-of-universe.com/index.php?nav=e and… and what about you ?? and i'll quote the american philosopher Charles Sanders first in saying that the only way we can explain initial conditions or the laws themselves is if they're the result of some mechanism of evolution if they change and there's some dynamical explanation for why that's a good thing for the universe to have a little bit more matter than anti-matter and moreover Charles Sanders first said and i think this is important to emphasize until we explain where the initial conditions come from or where the parameters and laws come from we haven't explained anything as he said the laws themselves just to state the laws is not to explain is not to explain the laws themselves require explanation * I have already given a vision of explaining the origin of the laws of physics and not only these let me just rest on the point that there needs to be not just some nebulous new idea but i would follow Charles Sanders first and say that it needs to be an idea about how the laws change and evolve leading, yes, laws, and all of them as we know them, did not originate in the Big Bang, but were recruited gradually - in parallel with the complexing of material structures, and these evolved mainly on the basis of the law of alternating symmetry. with asymmetries to the initial conditions at the beginning of our universe thank you thank you so i think probably fair to say that you all want to maintain the antimatter theory but have slightly different approaches to how you might go about it just before we look at the detail of the debate there perhaps * HDV no one has read yet, for 40 years… and it is very annoying, very sad, very strange it might be helpful just to clarify exactly what we understand by antimatter * I repeat: in the anti-world, packed time runs in the opposite direction, and geons are also "packaged" in the opposite direction; then the gate-wall between the world and the antiworld is not infinitesimal but both are wedged at some distance and indeed why some people would think that there might be a problem with it so Tara you were outlining for us the the uh the background to this is it right to say that antimatter the antimatter theory predicts that for every particle and potentially all combinations of particles there is an antiparticle * who lives in that anti-world, in the second quadrant, which is all

around us "behind the wall", "behind the curtain", behind the gate, a similar idea as string theories or groups of antiparticles it's it's correct to say that in particle physics which is the study of the smallest constituents of the universe the fundamental particles it's correct to say that we've identified a handful of different types of these fundamental particles * yes, the interaction runs "on the border of the gates", on the border of the "plastic" wall of the two quadrants and intersects… that are responsible for building up together giving matter conveying the action of forces and so on each type of fundamental particle potentially has an antimatter counterpart * it wants to be better understood, better known and explained (no antiparticle exists in this world for a long time, only for a microinterval of time. when you say potentially has doesn't the antimatter theory predict that for every particle there is an antimatter particle well just to complicate matters some particles can be their own antimatter version in that sense i say that potentially particles can have antimatter counterparts of course they all do it's just that in some cases um they are the same thing yeah so in terms of why some people see there being a fundamental problem with the antimatter theory it's that when a particle an antiparticle meat uh they as it were evaporate in a uh sort of cataclysm of uh * (here in this passage there is probably a faulty translation by the translator) matted destruction and you're just left with energy is that correct actually we're fine with that that's um that's that's the sort of thing we're happy with happening and what happens after that is that the energy that is produced * Namely, not only photons are produced, but also antiphotons, which will not be the same in something) I don't know why some particles are photons and other antiphotons (e- + e + = 2 γ says physics,) but I think that's where it should be confirmed that it is not two photons, but one photon and the other an antiphoton) can then go on into making new particles and antimatter particles if there's enough of it so uh according to the the solutions to the dirac equation which is where all of this originated there are there are two solutions the the the mata solution and the antimatter solution and the antimatter solution means that for every matter particle there's an antimatter particle against it and the problem potentially with that is that when these two meet uh they the mass is lost and you you get energy * (There is a mistake in thinking. The authors do not distinguish "matter" from "mass" and confuse these terms) and if that was the k if it was the case that the universe started with equal amounts of matter and antimatter and that was the initial proposal that it was equal amounts because you've got these two solutions so you would think that it would be equal amounts the whole thing would have gone up in smoke is that it is that the problem i suppose in a nutshell that is the problem so the issue for us is why are we here after that happened you know what what happened to let us be left over at our amount of matter * we live in the University quadrant where time runs in one direction, and the wave packs are "tangled" by the same spin…; Sadly, HDV is missing from this discussion
and that's what we really don't understand HDV ; we live in the Universe quadrant where time runs in one direction, and the wave packs "tangle-pack" also in the same direction, spinning what the mechanism is that allowed that and why that should be what it is that should make antimatter just that little bit different to normal matter to allow this amount of matter in the universe to survive in practice we find very very little antimatter in the universe don't we there's * and only antimatter is found in interactions where the antimatter particle lives only for a mini-time interval ..; antimatter is not found in higher atoms, molecules, chemical or biological compounds, we do not find it in stars, galaxies or in a black hole…, antiparticles are only "on a flexible gate" (between the world and the antiworld) where both quadrants intersect in small lines… a it's only a small amount of automata the vast majority of outers matter and where's all of the antimatter gone if if there was the same amount beforehand indeed indeed so it's all part of the same problem um antimatter does exist i mean it's it's not a fallacy or a fiction you it's produced in radioactive decay but not very much there's not very much of it at all so it's hasn't really got away from the main question of why if you start off

with half half if very quickly half of it seems to disappear more or less that's that's the issue which really affects our understanding of antimatter that's the big hole really i'd say in particle physics then in terms of the question that we're therefore facing um do we think that we've held this antimatter uh theory from from uh when direct proposed it uh roughly a hundred years ago not quite and um were we right to overlook these fundamental flaws uh in favor of just well we we like the look of it it's quite a nice looking theory and it does have some positive uh uh predictions which work will be right to do that or should we be you know exploring the the fundamental problems a bit more directly i'd say at the start that you um there's there's quite a few things in this question um so first of all the issue with antimatter and our understanding of it doesn't really say have anything to do with Dirac's prediction * this understanding does not contradict the two quadrants "divided by the gate" where in each quadrant time expands in opposite directions that that's fine it made a prediction there was experimental evidence that matched against it and that worked we don't have a problem with Dirac's equation uh there are flaws in our understanding though because we quite clearly don't um understand how the universe evolved * Here it is necessary to consider how the universe has divided into two quadrants ... still in accordance with the principle of alternating symmetry with asymmetries. (If you understand partners and superpartners in SM, then why not understand two quadrants?! With the opposite expansion of the time dimension ??) that is a pretty fundamental flaw in our understanding of the universe and master but to decompose it and break it down it doesn't mean that just because you know there's an element of the universe that you do not understand * HDV must be studied and taken into account it doesn't make your whole theory wrong you know that your theory has shortcomings is not complete and ultimately is not the answer but it might be effective it might work where in in the region where you have experimental evidence and where you're looking so you shouldn't throw it out from that point of view if it can still tell you something i mean obviously if it doesn't then there's no point at all in having it now you might also be asking about why should you one should be guided by this notion of simplicity that's inherent in direct's prediction which makes it such a nice prediction um anti-matter comes out of nowhere really really nowhere just just out of this um journey for Dirac to use the theories of the time special relativity and quantum theory to to provide the best description of an electron in any circumstance * The electron cannot be torn or broken, it is absolutely elementary. Only in the "foam of vacuum, on that gate between the quadrants arise" in a flat base of 3 + 3 dimensions by packing two balls of steam electron x pozotron, which are somehow "coupled" somehow both jump into the first quadrant, the second time into the second quadrant, I do not know exactly and out of it you get this idea of antimatter it's wonderful there's definitely a history in the subject that if you can find a simpler explanation one that cuts out complication it's generally taken to be the correct one and run with and until you find something wrong with it and i don't know to be honest whether that's something in our natures that attracts us to the subject that makes us look more kindly on explanations like that or whether it is genuinely an underlying feature of the universe that the simpler deeper explanations work better now i'm not really i'm answering this theme i'm just bringing up questions that i hope everybody else is going to explore so sabine do you think we should uh we should be driven by this simplicity and uh overlook some of the consequences of that well before i answer this question i want to clarify one thing that might confuse some people you said something to the extent that if you have manta and antimatter they annihilate to pure energy or something like that that there isn't really any such thing as pure energy this energy always has to be carried by something so if they annihilate they just create another particle O.K. it's just that we see that the universe usually is some kind of photon * that is, as I said: photon and antiphoton. Photon and antiphoton are identical in their zero mass, not in their "construction" of the wave package um that the universe is not only it does not only contain photons okay so now to answer uh your question is there some

problem should we go with simplicity uh and so on i um i i want to come back to what i said in the very beginning you were starting talking about Dirac's equation and that for every particle you have a partner particle * in the equation we have on paper. However, in the reality of the Universe, the antiparticles are in the "antiverse", ie in the second quadrant… and they can only move for a short time to the secondary quadrant and hurry back… that's an anti-particle uh just that as as Tara points out correctly some particles can be their their own anti-particles * O.K. photon and anti-photon um that does not tell you anything about the amount of that matter * (by amount of weight) (Mass is a property of matter. No Higgs boson gives "mass". And the property "arises" from the configuration, from the geometric shapes of the packing-curving of the dimensions in each particle. So all 25 elementary particles have one curvature of one of 3 + 3 dimensions the same. this needs to be explored !) (The Higgs-boson may be a "formation", a "fragment" of the crooked configuration of that "common curvature" to all 25 particles) that is in the universe um so dirac's theory doesn't say anything about it and there's absolutely nothing wrong with it um what some people think is wrong is that they do not like um that this initial condition must * Here it is spoken as if "conditions" were compiled, prescribed by the Universe "in advance", ie before the production of elementary particles, and then used "as conditions". I don't think so. Particle bundle formation had an infinite variety of curvature-curvature-to-package configuration options. But due to the "mutual barriers" each subsequent package (at the end of 25 pieces) produced, had to "adapt" to those already produced. And so in the end all 25 particles had a "common fragment", "in the package" have been so that there was a tiny little amount more of matter than anti-matter * I think the balance of matter and antimatter is the same throughout the history of the universe, except that the antimatter is "behind the wall, behind the gate", where time runs in the opposite direction - so "balance the number "of particles and antiparticles is still here, today, yesterday and in the first seconds after the" creation "of the Universe. Even after the creation of the Universe, no annihilation took place - only these artifacts split into two quadrants, into two worlds. Annihilation can only occur when particles and antiparticles come together in one of the quadrants. because otherwise as we already um discussed uh they would just have um left behind a lot of photons which is not what we observe are you suggesting that we should explore * Explore two quadrants, explore the possibility of the existence of two quadrants. And they're both all around us. They are separated on the Planck scale of sizes i mean you were saying it just a little bit more that's presumably because you're thinking well if we have just a little bit more matter than antimatter the uh that will that will be the bit that's left over because the remaining uh mata and antimatter will be turned into photons and uh and the matter will be destroyed * "Destroy matter" means only, "straighten the curvatures of the dimensions of two particles" on a molten flat space-time so we'll just be left with the mat a bit so we don't have to have the same sort of huge uh split in favor of matter (**) at the outset is that what you're arguing well i i think i'm just referring to the number i think Tara must know this right i mean there are some estimates from cosmology how exactly how much more matter you must have had in the beginning of antimatter and it's a tiny amount which is like i don't know 10 to the minus 11 or something so the the question is really um in this i i dare to say beautiful assumption of symmetry (**) The google translator doesn't tell me exactly what Tara meant, and if I think Tara had in mind the asymmetry of the number of particles and antiparticles that "appeared" (for no reason) after the creation of the Universe, then it's wrong logic. How do you want to do - demonstrate the reality that in a pile of billion + one particle and billion + zero antiparticle this pile is annihilated, one particle remains and kousek and a little further there is such a "billion pile" annihilated and again one remains, and again a little further dtto and 10^{53} kg of baryon mass accumulates those excess ones. That is logical nonsense. (and moreover, that after each annihilation a billion photons and antiphotons will be created and they will fly "somewhere" ..where ??? when there is no space after the Bang). I

think that the model could be according to HDV, ie that after the Bang when there is "foam of dimensions", ie the space-time of curved dimensions, and in it already "packages + anti-packages" (almost infinite number of packages), which float that this foam of "packets" differentiates into particles and antiparticles and… and each sits "in its quadrant", and it is not illogical that there is an asymmetry in the number of particles and antiparticles. It already prevails because asymmetry is the law of this Universe. Guth's idea of inflation would even fit into this logic, that in the "infinite foam of 3 + 3 curved dimensions" an infinite number of opposite packages will be equalized to create "spatial inflation -" inflating "a flat 3 + 3 D and still the final number of packages - particles 10^{53} kg will remain and chart conservation or what have you uh which we don't know is correct the assumption is the ratio was exactly 1.0000 okay and that does not agree with observation um instead the ratio was more like something like one point zero zero zero zero zero one okay and i'm saying where one of these numbers is exactly as simple as the other number okay so the people who think that there's something simpler about the last digit being a zero uh then it being a one uh don't understand this requirement of simplicity and uh without that it comes down to an argument from beauty and i don't think that's a scientific criterion which is why i don't think it's a serious problem so lee beauty is not a serious scientific uh concern would you agree with that i don't that's uh that's a debate that i've been having on different terms with Sabine for a long time but let can i correct some of the discussion here and be a little bit more specific there are two theorems that are essential to particle physics that are at stake here and when you say something like there's a flaw and is should we be responding to the flaw this is what you're really referring to so let's put them on the table there is a symmetry called cpt which means take anti-particles reverse the direction of time and look in the mirror and cpt is a theorem in a certain class of theories called quantum field theories that respect both the axioms of einstein's theories special relativity and quantum mechanics if you believe those two theories are ultimately correct then you believe that doing those three things must be like doing nothing and that's relevant because of the role of c to turn particles into antiparticles but to turn that into a prediction that during the the growth of the universe needs there would be an equal number produced you need another assumption as was demonstrated by sakharov who was one of the great soviet theoretical physicists and cosmologists and that's the assumption that the universe as it expands is already is always in thermal equilibrium so that there's a balanced equation as in chemistry so the rate of production of particles is the same as the rate of production of antiparticles and that's not necessarily true and it's not difficult for the cosmologists to hypothesize and study scenarios in which during the expansion of the universe it was out of equilibrium and that's all you need you don't need to overthrow the foundations. Myslím si, že v rovnicích „můžeme si“ léčit (pravá strana rovnice se rovná levé) mezi částicemi a antočásticemi není problém, ale v přírodě ano. Přiroda v interakci tu drží „drží“ po různou dobu, jednou dlouhou jindy velmi krátkou. Nakonec se všemi rozpadnou. V interakcích (fyzikálních) s antičásticemi si antičástice pak „zaleze“ do svého antisvěta - druhého kvadrantu.)

i'm the guy who loves to overthrow the foundation * that makes two of us.. it's completely conventional to solve the problem by having the universe expand so rapidly in the early stages that it goes out of equilibrium for a little while and then you do produce more baryons than antibiotics * The "deviation" from equilibrium is the reality that the interactions of the curvature changes of all particles, all groupings into new groupings „are solved in interaction tak and so the particles both“ pack ”, how the dimensions are packed into new configurations, and both directions in the time arrow "there and back" .. and there's a whole subject in which people study how that might happen and discuss all the ins and outs of different hypotheses (but without HDV, which he ignores ..) about it so there's no crisis here there's nothing there's no flaw i wish that i love to talk about flaws and crises but that's not the case we're dealing

with so do i understand you in saying that well yes there are things that uh we need to come up with explanations for but we can modify the theory we don't have to have some sort of radical transformation is is that is that what you're saying though it's not a modification the universe expands and if it expands fast enough it goes out of thermal equilibrium and sacrifice that's all that we need but but some people may might say well that's just an ad hoc way of trying to explain why we get the outcome that we do and maybe it's a satisfactory way of explaining that but there are alternative ways of uh of coming to that conclusion and it's not currently in the theory is it it's a it's a postulate we're looking for the best explanation * (no looking, you haven't seen HDV yet - maybe intentionally) that's what science does it looks for the provisional best estimation and this is certainly an open problem it's not tied down but neither is it a fundamental mystery like the measurement problem in quantum mechanics or quantum gravity or several several of the others um one could go that way for example you could say um maybe special relativity isn't really exactly true * Yes, I have come to the conclusion that special relativity testifies - it presents an "unexplored" essence: o rotation of systems (observer systems and observed body systems in motion); therefore, the rotation of the body's system in motion is related to the global curvature of space-time, http://www.hypothesis-of-universe.com/docs/aa/aa_057.pdf ; http://www.hypothesis-of-universe.com/docs/g/g_034.pdf ; http://www.hypothesis-of-universe.com/docs/g/g_075.pdf ; when you get to really really really short distances that's an area that samina and i have tangled in is the world that that creates and maybe that would undermine the CPT theorem and maybe that would give another avenue to make an asymmetry between barons and after that there are certainly people who have written and talked a lot about CPT violations in quantum gravity but i'm not aware that i've said the terrible lot about uh what happened in the earlier universe the problem is that there are so many other things that come in there so maybe this is something that Tara can tell us about uh you know there's there's very little that we can directly see about the early universe * http://www.hypothesis-of-universe.com/docs/j/j_202.pdf ; http://www.hypothesis-of-universe.com/docs/j/j_193.pdf ; http://www.hypothesis-of-universe.com/docs/j/j_188.pdf ; http://www.hypothesis-of-universe.com/docs/j/j_201.pdf ; http://www.hypothesis-of-universe.com/docs/aa/aa_133.pdf ; so a lot of this comes down to speculation um but we have particle colliders right uh so uh what can we learn from that particle colliders can only take us so far and yeah you're absolutely right um if we if we have an explanation we know it's an explanation we need experimental evidence to confront it with to make sure it matches it's um i mean it's really helpful to have ideas and it's really helpful to have theoretical guidance * (I build my HDV for physicists to provoke, to attack their thinking) but at the end of the day we we need both of these things knitted together to have a fulfilled explanation and the whole idea and principle of our experiments of particle colliders is to recreate the very high energies of you of the universe when it was at those very early points something like 10 to the power minus to the minus 12 seconds after the big bang * There is a state of space-time "like boiling foam of dimensions" - there is no matter yet - there is no matter and there is not yet a list of later laws. Both are now born of that "foam of curved dimensions 3 + 3D" (every state of curvature of time-space dimensions is already matter-energy) that's the sort of energy scale that i'm talking about and we can study matter at that point and we can study antimatter at that point and we can look for differences in their behavior and it's coming at this problem really from the bottom and taking a bottom-up approach to see what are those differences can we measure a difference what might they mean we need help interpreting this and that's the stage where we are um in the experimental field so lee has the the um the approach that's this this is unsolved but it's not a really fundamental problem it but it will be solved i'm perhaps at the other end wondering how i can provide evidence to confront a theory at the very small levels that might um show it's right or not so for me there's still a bit of a golf there it isn't the case that so sorry

these these energies that you were just talking about that we can produce uh at uh big colliders and so on are still way way way below um the energy scales where the particles would actually have been produced right like this face that lee was talking about is just way out of experimental uh test isn't it that's that's that's that's absolutely right so there's 10 to the minus 12 seconds i was talking about i mean that is the experimental limit um so how far we can go cosmology is perhaps the the theory that takes over at that point to go back to the very earliest times but there isn't there's not direct experimental tests in the sense that we can link to particle physics yet because we simply don't have the technology or the ability to know how we can test it and create an environment that would be representative i wonder at that point we could you know move on from this initial conversation about the nature of the problem too the question of whether the antimatter puzzle is going to be solved by experiment and that's very much related to what you were you were talking about there tara do you think experiment is going to be the solution to this yes and no i mean and and i say yes or no simply because you need experiment and you need theory i think they're both parts of the scientific method that get you to the answer you you you need to have experiments to give you the evidence to confront theory and hypotheses (!) * with to see if they're correct but you also need theory to to take experimental evidence and give context to it and interpret it you can't you can't get knowledge um just by having one of them you need the other as well so is it going to be sold by experiment or yes but it's also going to be solved by theory as well by both of them together lee do do you think that theory has to lead here and is there a danger that theory just sort of spins free that it's not constrained enough by empirical data especially if you know our our kit used to uh to do the experiments just can't deliver the energy levels uh to uh to test the theory thank you there is a danger of theory getting too extravagant and getting out of the reach of the experimental chat do you think that the solution is going to be found with uh colliders and big building ever ever bigger ones in search of experimental data no definitely not i mean to begin with i i was trying to explain that i don't think there is a problem right so now i can't possibly say that we need a colitis to to solve the problem so um no i mean it's it's not a problem uh we don't need to build a bigger collider um to figure out how that works but maybe let me come back to something that uh Lee said in the beginning because i think that's a that's a very interesting point since you were asking about what what can theory theory do for for us um so as i said the kind of theory that we currently use like the standard model and also general relativity they generally have a problem with certain types of questions when it comes to an initial value like the the ratio of matter to anti-matter but also other things like for example in cosmology people are discussing the question why is the curvature of our universe what it is and that also goes back to a question of of an initial condition and there are lots of other issues like that which you just cannot solve within the framework of the theories that we currently use you you need an entirely different type of theory !! HDV and Lee has worked on one of these which i think what do you call it cosmological natural selection the way i like to think about it is is it asks the question are there certain universes that are in a very specific quantifiable way better than others and that kind of theory = hypothesis is an example of a theory that could actually answer a question like this like are there certain ratios of matter that are in a very specific way better than others and maybe there are other you know theories that can do that kind of thing but it definitely requires a new type of theory !! HDV but as i understand it Sabina i think you uh you're arguing that we can solve this problem by by playing with the initial conditions *
Starting conditions? after Bang, what is it? and what are they like? I'm thinking (so far) of three:
01) The principle of alternating symmetries with asymmetries (this is also related to the vision of what the Universe looked like before Bang… which was the "first" symmetry of 3 + 3 dimensions space-time and ... and after Bang there will be a sequence of alternating

symmetries with asymmetries, ie plasma = boiling foam of curved dimensions in which elementary particles are born, then elements, compounds and laws… also laws that "disrupt" conservation..etc.)
02) The curvature of the dimensions of space - time quantities leads to the construction = to the realization of material elements (hereinafter conglomeration, etc.)
03) Even the laws of physics (hence the chemical laws, biological, etc.) arise in parallel with the sequence of new material elements and complex structures during their interactions. Other "original" conditions "did not arise", but were born gradually klad interpretation of it at another time…
and and uh but how are you going to test this um you might have alternative theoretical uh solutions and glee's been giving us a bit of a guidance to his one but aren't you going to have to look at the experimental results in order to be able to determine which theory to adopt well yes of course i'm not sure i understand the question i mean we have data we have theories we ask which is the best theory to fit the data and right now that's the standard model and there's no contradiction with the data exactly because you can choose the initial condition as there's no there's no contradiction with the with the theory so long as you choose the initial conditions to have
that outcome and then we have to just check well well is is it plausible that that would be uh or is that a well you can't there's this question is it plausible you cannot answer within the framework of that theory the initial condition * It will still be necessary to find out the "initial condition" by what and how the Universe itself chose the "shape and curvature of the elem. particles ", which then leads to further" data "that can be measured. is an assumption that you have to enter into the theory you're asking a question of the type like was this a probable initial condition * We do not choose the conditions, but we find out them! (we find out: what parameters did the Universe choose itself and why) to achieve this result, and then we just have to check well whether it's likely to be uh, or is it, you can't, there's this question, it's likely that you cannot answer within this theory. The initial condition is the assumption that you have to enter a theory (??) that you ask the type as if it were a probable initial condition, something like this and indeed a lot of cosmologists.
Like to argue that way but there is no way we can ever measure this probability it's a completely metaphysical argument it's not it's not proper science do i understand you're saying that you you are actually having a a strong position there of saying experiment just doesn't solve this it doesn't solve (I didn't understand what the discussants were talking about here) it i'm not sure what you mean by that it has not solved it so far maybe it's possible it will solve it but to do that we first need a different theory HDV so within the current theoretical framework ultimately you can't solve the problem you will always need to put in some initial condition and then you can ask well why this initial condition * (every initial condition must be outlined!) and we can only shrug shoulders because we cannot ever explain this initial condition uh within the context of the theories that we currently have yeah and so how do we decide between those theories if it's not something that can be determined by looking experimentally what is your process for choosing * I understand, but less so how can an experiment always decide between two theories? For example, the theories are QM and OTR; one is linear the other is non-linear… how do you want to experiment to decide "why these cannot be combined into one theory"? between one theory and another oh i'm not saying you can't decide between them experimentally certainly if you had such a theory it would also make different predictions maybe you can say something about that well i can and the theory that you mentioned you're kind enough to mention for example predicts that the largest stable neutron star should be no more than twice the mass of the sun and that's a prediction which is very vulnerable at the time at the present time we do not typically in science test theory test theories against nothing we test theories against other theories (?) and i would think from

Tara's point of view and you really said it what you want us to do is make alternative theories which have some amount of plausibility which make a prediction that's different than the current standard theory and one of the things that fire harbor emphasized is that a measurement or an observation that presently has no significance at all can come to be a crucial test of the new proposal against the old proposal * I understand that one day I will first build a theory and test-verify it by observing whether they are consistent. The second time I have first observed data and I come up with a theory for them ..; I have one hard opinion that the Hubble equation is not correct, it is not linear, and we observe "rape" the data to confirm the theory, we are not interested in looking for a contradiction - for example, that the Hubble equation is not linear and then it means that the universe EXPANDS not EXPANDS so the possible role of experiments is not static it grows creatively as the theoretical challenges grow and we're used to saying that to test a fundamental fear a more fundamental theory beyond the standard model we have to go to certain energies and tevs and to test quantum gravity * (In my opinion, this is bullshit. Susskind beautifully explained on a black hole how the surrounding Universe passes into ČD… which is philosophically and logically the same as the linear world in the microcosm (nuclear interactions) passes into the nonlinear world of the gravitational macrospace - OTR. Both theories coexist combine them into some "quantum gravity") we have to go to a certain energy and plant units but wait somebody may invent a beyond the standard model theory the challenges experimentally the present theory in a holy unexpected way before galileo nobody would have thought that dropping objects off a tower was a test of fundamental theory and because galileo invented an alternative to aristotle all of a sudden it became uh with the right interpretation a test of fundamental theories Farhavan certainly proposed a very different way of thinking about science from the from from the traditional one and drew attention to the uh the extent to which the way we interpret the world with our supposed facts in experiments is a consequence of uh of the theory itself but far and far far and surely has the puzzle of how do we choose between the theories in the first place you know he st he still got that puzzle and um i mean maybe tara you know as the experimentalist here you presumably want to uh want to defend experiment from from uh being at sea amongst theory um well i never think experiments that see i just think of experiment has a limit it's it's inability to test all of the regions which would allow us to um adequately test theory simply due to technological sort of complications and our inability* to to um invent new materials etc fast enough to me experiment is the ultimate arbiter to choose between different approaches in theory because it is it's it's a fact it it it supplies a fact that has to be met by theory if that theory is going to be correct so that that's the way as an experimentalist that i view this and i'm really interested listening to the discussion about how this is a problem caused by different initial conditions and whether that the existence of different initial conditions is itself a problem or not to me i'm really at the other end of this problem and i can i can appreciate very much what you're saying from my experimentalist point of view i would really prefer to have this expressed in terms of predictions that i could then see whether um they were correct or not and and i know this isn't possible um particularly in in my regime of experiment it needs different types of experiment but to me that is the way that we can move forward it's not enough just to choose between theories as you've said or to apply a principle to choose a theory or not it has to match reality this is why i don't think working on the supposed baryon asymmetry or material antimatter problem is a good strategy um you know it can be solved quite an easy way there's no particular reason to develop a new theory um but uh as Lee has already pointed out there are serious problems uh in the theories that do require uh an improved theory like for example. HDV.
The measurement problem uh quantum gravity uh or maybe one can also add like dark matter like there's something in need of explaining *(Every state of curved space-time on the Planck scales is essentially the "dark energy" = boiling vacuum of dimensions. This is the dark

energy that increases as the universe expands, but the density is constant.) which we currently can't explain and so if you manage to develop a theory HDV that solves one of those problems uh then hopefully that theory HDV will also make new predictions which you can then go and test with um i don't know some telescope mission or a particle collider or you know some some some other kind of thing it just that i think this this baryon isometry uh is not is not a particularly promising problem to solve because uh there's no problem in need of a solution can we envisage a situation * I do not understand where we do have a complete theory of antimatter * again my opinion: antimatter lives in the second quadrant čp in which there is the opposite arrow of time and… and "antiparticles" are packaged, dimensions are packaged "with the opposite arrow of time" (opposite spin?) or might we somehow reframe it as something else as you seem to be implying what what i'm interested in is what we mean by theory not to have a feel i love to have a philosophical argument but for example what i'm studying now is whether and you're going to tell me i'm crazy whether it would make sense to say that the laws of physics learn how to be the best laws as the universe evolves maybe much of this is before the big bang and that sounds crazy but let's note that we have these intelligent machines that we think can learn * That would make Sabina's speech better. and i i'm staying far away from are they anything like us are they conscious i think we will admit that they can learn and if i can code the instructions for one of these intelligent or learning machines in the laws of the standard model then i can envision a situation where the standard model is what it is because it learns something about how to be a universe and i know that's sounding provocatively crazy but i think it's the let me quote find them if a whole lot of smart people have failed to solve a problem despite much much effort then maybe it's time to turn the problem on its head HDV and it might be that you discover HDV it's an entirely different problem that does have a solution ! HDV and i do think that it overall the situation in fundamental physics is calling for very for new ideas and different ideas about what theory is and how it relates to experiment but i i think we have if we go there then everything like this is at stake well that's a very sort of profound suggestion uh lee and um obviously to to see laws of something that might change and evolve uh would be a radical uh alternative to the way that we currently currently understand how science functions fascinating suggestion uh Sabina what what's what is your thought in response to that you know i i'm going to say the thing that Lee has heard like one one million times uh if if you have a law that changed uh then you have a different law that tells you how the law changed so it's again a law i'm only talking effective field theory and that's i'm not actually saying anything profound i'm an instrumentalist okay if you give me a theory uh and uh i can calculate something with it and uh it fits to observations i would call that good theory and there other people like to tell stories about what this mathematics means okay it may be that the universe learns or the universe makes new universes and so on and so forth and i would just say well that's a kind of an optimization problem okay you can you can always uh look at it from that perspective and and that's uh that's fine with me and and i actually think that um to move on in the foundations of physics we we kind of need a theory HDV like that maybe not exactly this but something in this direction and maybe uh i i um so there's kind of a related idea HDV has been put forward by um David Deutsch um who has this idea of constructor theory um and i i don't really feel uh confident enough to to tell you exactly what this is about but but basically he's he's saying that um this route that we've been on um in particle physics and in cosmology that we're looking for explanations going to shorter and shorter distances and further and further back in time may have its limits and he's trying to say that maybe some of those explanations may actually be found on larger scales and one of the examples that he's given to me is that maybe the laws of nature are so that they have to be turing computable okay so he's a computer person so so that's the kind of problem he would come up with and that put some restrictions on how the laws of nature are but it's not something that you would find by going

to shorter and shorter scales or asking about the initial conditions of the universe it's a kind of explanation that we don't currently think about in the foundations of physics and i i kind of feel that we need some entirely new thought thoughts of of of that order of magnitude to move on it's all right where do you you uh you stand here do you think we're going to have a complete theory of antimatter at some point or do we need something radically new well i i'm not feeling really optimistic HDV after listening to to lean Sabine because well first of all um i i don't regard it as a complete theory of anti-matter it has to be a complete theory of matter plus forces and and then as an experimentalist i get slightly um depressed by this because we have this theory the standard model which despite everything we throw at it just bounces back again and we know it's it's got to have limits and we have been unable to find the limits and the breakdown and how we can move forward to something deeper so i would really really love there to be a fundamental problem with the way that we're viewing the universe i would really love there to be a fundamental shift needed in our in our viewpoint and our ability to describe it and for that to be realized i think that ..

HDV does not break through contemporary physics, HDV only provokes deeper reflection, new reflections, visions, HDV presents only more and new alternatives, possibilities of looking at our Universe and the origin of everything. I will not live to see it, but I believe that one day my HDV will be discussed and taken as a meaningful version ... although in this form it is still imperfect.

JN kom 15.06.2021 czech version http://www.hypothesis-of-universe.com/docs/aa/aa_138.pdf + 31.08.2021 english